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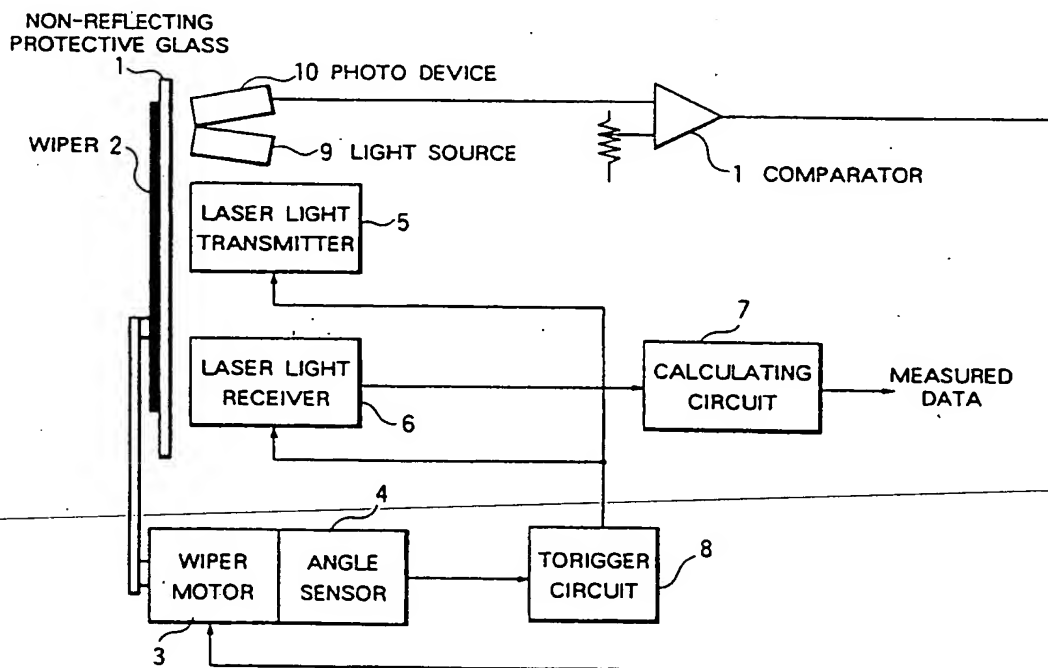
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**W-8000 München 22(DE)**(54) **Distance measuring equipment for car.**

(57) A distance measuring equipment for a car arranged such that a wiper is driven only when a light reflection condition of a non-reflecting protective glass is detected with the light input/output to the

glass. Additionally, it can be arranged such that the measuring operation is interrupted only when a driving angle of the wiper resides in a predetermined measuring angle range on the protective glass.

**FIG. 1**

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ing angle of the third means detected by the fourth means resides within a range of a predetermined measuring angle of the first means, the fifth means interrupts the measuring operation of the first means.

Thus, as shown in Fig.2; when the wiper resides outside a range of a predetermined measuring angle  $\beta_1 \sim \beta_2$  defining a measuring region A of the first means on the protective glass, the optical measuring process is made as usual.

On the other hand, however, when it is found that the wiper resided within the predetermined measuring angle range  $\beta_1 \sim \beta_2$ , the operation of the first means is interrupted.

Thus, even when the wiper starts to operate as noted above, the first means is not operated so that no mismeasurement due to the wiper is obtained.

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be more apparent to those skilled in the art from the attached drawings in which;

Fig.1 is a block diagram showing a schematic arrangement of one embodiment of a distance measuring equipment for a car according to the present invention;

Fig.2 is a graph showing a functional relationship between the operation of a wiper and the measuring angle range of an optical measuring means used for the present invention; and,

Fig.3 is a flow chart illustrating the algorithm of a trigger circuit used for the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, an embodiment of a distance measuring equipment for a car according to the present invention will be described.

Fig.1 is a block diagram illustrating the arrangement of one embodiment of a distance measuring equipment according to the present invention, in which a non-reflecting protective glass 1 forms a front window (or a rear window under some circumstances) of a car (not shown), a wiper 2 is provided outside the glass 1 to clean up raindrops or dust which adheres to the protective glass 1, a wiper motor 3 is connected to the wiper 2 as means for driving the wiper 2, and an angle sensor 4 is provided for detecting the driving angle of the wiper motor 3.

Also, a laser light transmitter 5 having a driving circuit transmits laser light toward an obstacle (car) through the protective glass 1 and a laser light receiver 6 having a timer circuit is positioned to receive the laser light reflected at the obstacle and is connected to a calculating circuit 7 for calculating a distance from an observing car in which this

equipment is installed to a measured object, i.e. a forward or backward obstacle. It is to be noted that the laser light transmitter 5, the laser light receiver 6, and the calculating circuit 7 form well-known optical measuring means provided inside the car.

A trigger circuit 8 is provided as means for generating a control signal for driving or interrupting the laser light transmitter 5 and the laser light receiver 6 with reference to the output signal of the angle sensor 4.

Moreover, there are provided inside the car a light source 9, a photo device 10 for receiving a reflected light of the light output from the light source 9, and a comparator 11 which compares the output of the photo device 10 with a reference level to provide the wiper motor 3 with a control signal indicating whether or not the operation of the wiper 2 is necessary. It is to be noted that the light source 9, the photo device 10, and the comparator 11 form means for optically detecting a condition where the protective glass 1 reflects light.

Next, the operation of the above embodiment for a car will be described hereinafter with reference to Fig.2 showing a functional relationship between the operation of a wiper and the measuring angle range of an optical measuring means and Fig.3 showing the operation algorithm of the trigger circuit 8.

Now, if no rain drop or dust adheres to the protective glass 1 so that the protective glass 1 presents its own non-reflecting characteristic, light output from the light source 9 is not reflected at the protective glass 1 but is released outside the car, so that the photo device 10 has no reflected light as an input. Therefore, the input to the comparator 11 is correspondingly at such a low level that does not exceed the comparable reference level, so that the output of the comparator 11 is at "L" (low) level not to drive the wiper motor 3.

In the meantime, a well-known optical measurement is carried out such that a time interval from the time a laser pulse is emitted from the laser light transmitter 5 to the time the light reflected from a forward or backward obstacle is returned and detected by the laser light receiver 6 is provided for the calculating circuit 7 which calculates a distance between this observing car and the obstacle from the time interval.

On the other hand, if raindrops or dust etc. adheres to the protective glass 1, the output light from the light source 9 is reflected at the protective glass 1. Therefore, the output level of the photo device 10 becomes so high that it exceeds the reference level of the comparator 11 so that the output level of the comparator 11 becomes "H" (high) level.

Therefore, the wiper motor 3 responsive to the output of the comparator 11 drives the wiper 2

FIG. 1

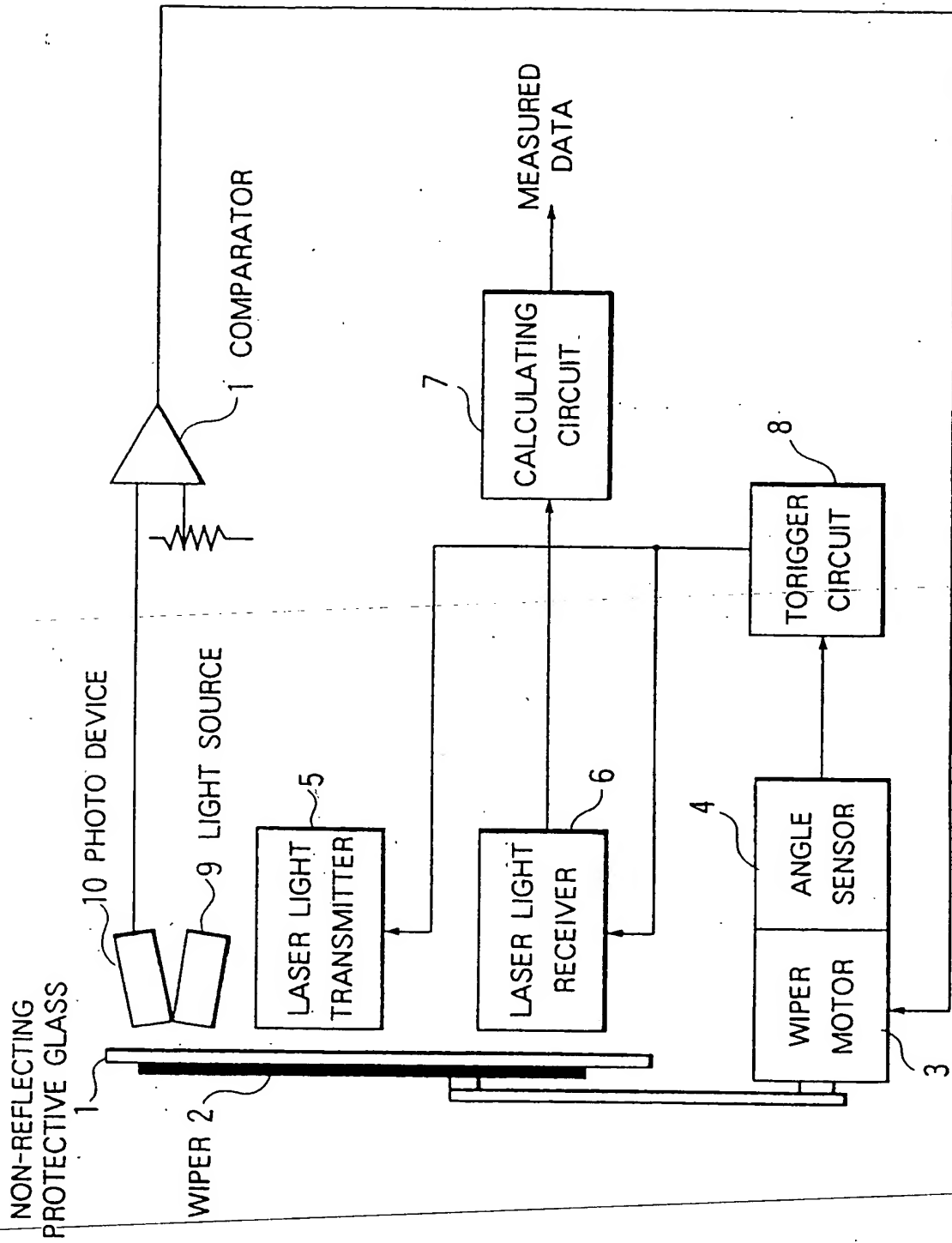
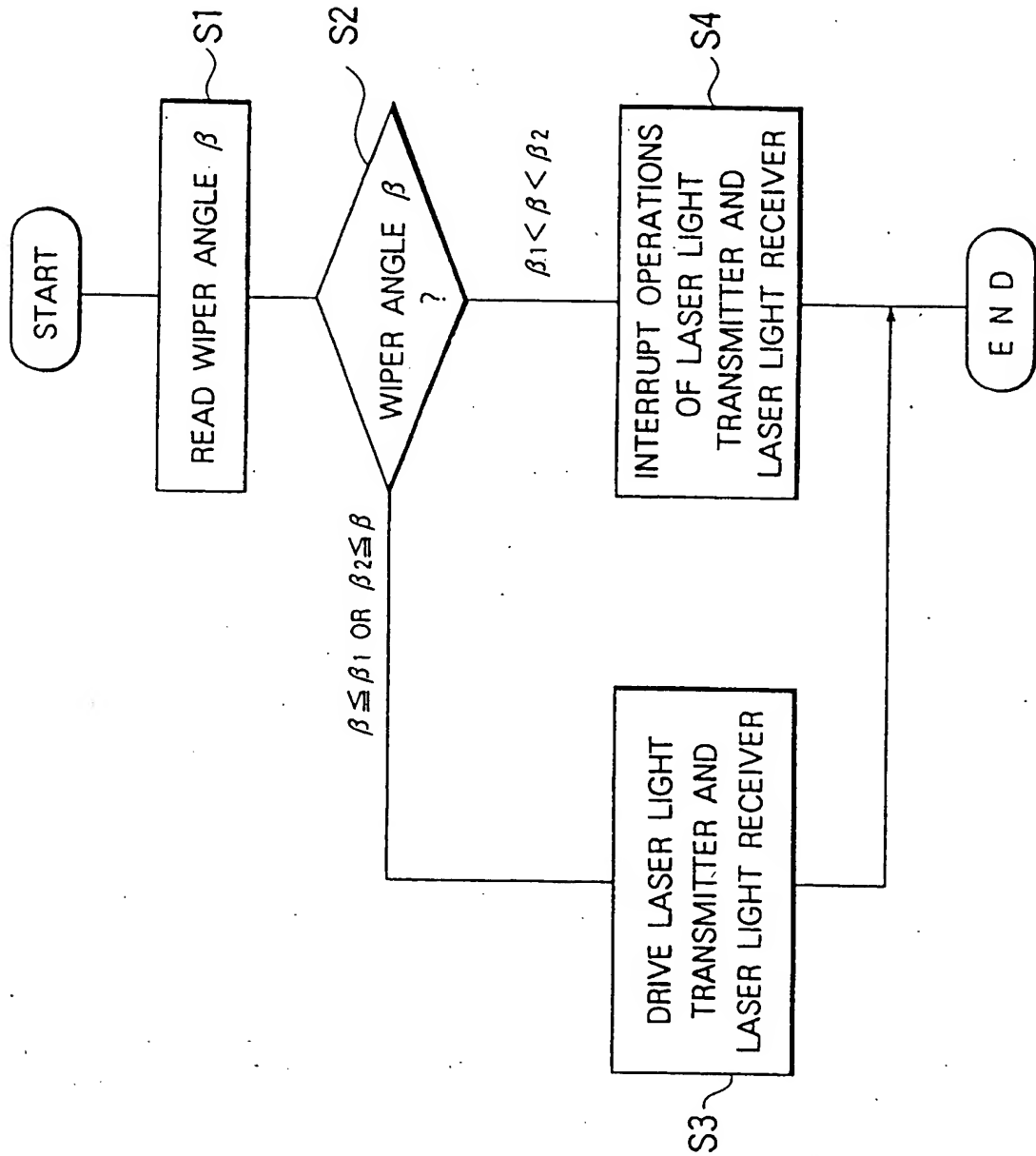


FIG. 3



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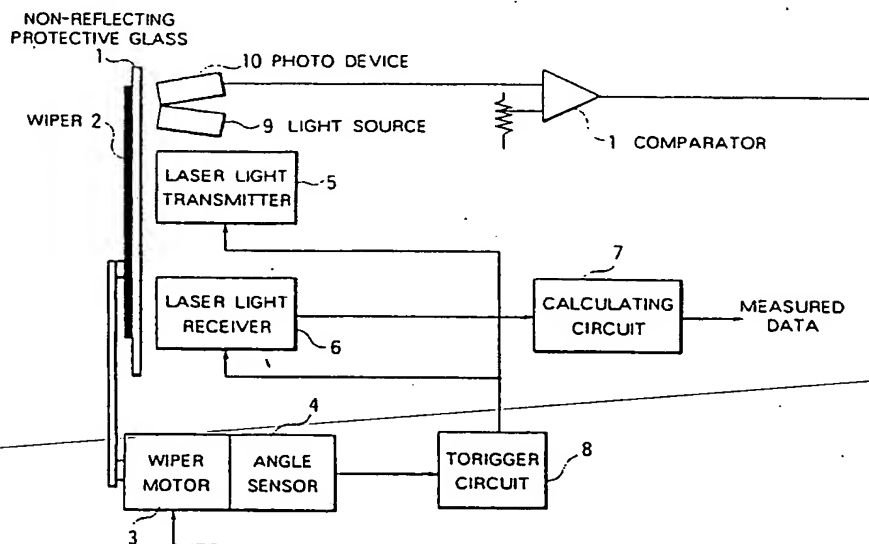
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**FIG. 1**

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